

STANDARD FORM NO. 64

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TO : Chief, TISD

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DATE: 19 December 1958

FROM : Chief, Graphical Analysis Branch

SUBJECT: Concerning the Role of Graphical Analysis in Photographic Intelligence

The art of producing photographic intelligence has entered an age of complexity resulting in the need for a new approach to the problem. Essentially, this new approach removes from the photo interpreter the necessity of being a "Jack-of-all-trades" and instead places upon him the requirement of selecting a specialty within the field of photo analysis best suited to his tastes and training. Consequently in the solving of most interpretative problems there is the need for team work, that is, the application of various skills in order to produce the best possible photographic intelligence. The major skills, or functions, may be summarized as follows:

1. The procurement of collateral information to aid in the analysis.
2. Photogrammetric analysis and precise mensuration.
3. Analysis of physical characteristics and graphical presentation of those characteristics.
4. Functional analysis.

When photography was first extensively exploited during World War II, all the steps outlined above were accomplished in the main by one man - the photo interpreter. His specialty was simply the reading of photographs. With

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training a man could be taught to recognize various types of military emplacements, components of industries and so forth. He was helped along by "keys" prepared by other interpreters who had the preponderance of their experience in a particular field. Relatively large-scale photography and the nature of the items interpreted made the gathering of information from photography a different problem from the one today.

Essentially the photo interpreter was left to his own devices to develop any collateral, to make measurements, to determine shape, and finally to identify the object. As a "Jack-of-all-trades" he was usually master of none. As photo interpretation advanced as an intelligence art it became obvious that a more thorough search of collateral was necessary and that more refined measurements were essential in order to gain the utmost from the photography. The mass of collateral that could be brought forward on many areas was staggering; most of it was conflicting and little was completely accurate in all details. For the PI to have to research the great volumes of material would cut down his effective time as an analyst. Consequently the basic researching and the procurement of collateral was turned over to specialists in this field. The situation was similar in the mensuration field. Due to the all-source and varied types of photography used, no longer was it sufficient to know simply that scale was equal to the photo distance divided by the ground distance and other equally basic formulae. Individuals with photogrammetric and advanced mathematical experience were needed to solve the numerous mensural problems.

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The division of responsibilities left the photo analyst with more time to develop a specialty in one or more of the interpretative fields. This was further promoted by differences in primary interests. The photo analyst working in his special field had the task of collating that which he saw on the photography with collateral information and mensural data and to set down his interpretation in words and illustrations.

It was found that the analyst who had the ability to perform a precise functional analysis on a particular subject, often was not able to depict graphically that which he saw nor could he pass the information on to an illustrator in such a way that a satisfactory rendering could be obtained. The problem therefore was to find a photo analyst who could illustrate or an illustrator who could perform photo analysis. At this point there was introduced a new skill called graphical analysis.

Graphical analysis has long been intertwined in the photo interpretative art, the providing of plan drawings being one of the functions of the photo interpreter. But only recently has graphical analysis increased in stature so as to be able to claim its position as one of the major functions in the production of photographic intelligence. This has come about in answer to certain requirements which could not be satisfied by the normal capabilities of the functional analyst. Essentially these requirements called for descriptions of installations, the functions of which could not be readily or exactly

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verified. Thus the various specialties of the functional analyst were often not of positive use. For installations located in denied areas, collateral information was often lacking or so limited that no substantial clue as to its identity could be obtained. Unable then to compare what was seen on the photography with known installations, the best that could be done was to extract the shape and size of the various objects and reconstruct them graphically in order that the combined knowledge of the intelligence community could be brought to bear on the problem. This could best be done by the photo analyst - illustrator or graphical analyst as he has been called.

Certain utilities and capabilities of the graphical analyst are apparent. Whenever a project requirement calls for precise determination of configuration, then the graphical analyst is best suited for the task. This is because as an illustrator he is occupied with the problems of planes, angles, and shadows which in combination define shape on the photograph. Determining shape from shadows is little more than the reciprocal of showing in a drawing the shadows cast by an object. An inherent advantage in rendering a drawing relying solely upon what is seen and deduced from the photo itself is that the analyst is not swayed to make an object conform to a preconceived notion of what it should look like.

The task of the graphical analyst then is to produce from the available photography an initial and unrefined working drawing which can be used by the interested analysts to resolve any points of contention as to the configuration of whatever is involved. This resolved drawing can then be the basis for the taking of measurements.

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It becomes apparent that the graphical analyst is of necessity an essential link between the functional analyst and the photogrammetrist. It is evident that in measuring the photogrammetrist has to be guided as to what measurements he is to make. Often these measurements are of barely interpretable objects, and someone has to make the determination of the terminal points. Since these same terminal points have to be determined in order to make any drawing it is the graphical analyst who most often is best suited to determine these points while he is making his initial drawing.

As a result of his study of the photography the graphical analyst is often well suited to make, under the direction of the photogrammetrist, many of the measurements himself. This is not to say that he takes over the role of the photogrammetrist in solving problems of tilt, obliquity, scale, etc., but rather that he performs the mechanics of measuring. In so doing he releases the photogrammetric specialist whose services can be more profitably applied to more complex problems. He also is in a position to make sure that the measurements that are made will combine with his initial working drawing to produce a refined product. This work can be done either in support of the functional analyst or as primary response to a requirement.

It is important to remember that the graphical analyst is a photo interpreter and as such is in a position to assume primary responsibility for answering a requirement whenever that requirement is simply to determine configuration and does not necessitate detailed knowledge in a specific field such as nuclear energy, missiles, or electronics. On the other hand when a requirement calls for identification of components, production capacity,

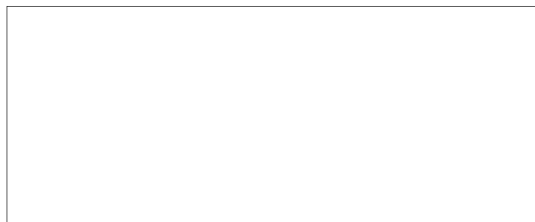
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flow patterns and other functional aspects then the functional analyst should have primary responsibility for the project, and the graphical analyst should act in whatever support capacity is appropriate.

At this point it must be realized that graphical analysis is still in an early and exploratory stage of development, and it is difficult to predict its ultimate scope. In any event it appears certain that graphical analysis if used to its fullest capability will be a distinct asset in the production of photographic intelligence.



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